

YOU WILL
NEED A
TEXTBOOK
& RULER

~objective~.

Solve problems involving scale drawings

Scale Drawings

Vocabulary

Use a Scale Drawing or a Scale Model

Scale drawings and **scale models** are used to represent objects that are too large or too small to be drawn or built at actual size. The **scale** gives the ratio that compares the measurements of the drawing or model to the measurements of the real object. The measurements on a drawing or model are proportional to the measurements on the actual object.



Real-World Link

Room Model Architects make detailed drawings of rooms and buildings. Conner made a drawing of a bedroom. Follow the steps below to make a model of a room of your choosing.



Step 1

Measure the length of three objects in the room. Record each length to the nearest $\frac{1}{2}$ foot in the table below.

Object	Length (ft)	Length (units)
Dresser	10	5
Bed	12	6
Rug	12	6

Step 2

Let 1 unit represent 2 feet. So, 4 units = 8 feet. Convert all your measurements to units. Record these values.

Step 3

On grid paper, make a drawing of your room like the one shown.

PRACTICE PROBLEM # 1

ot It? Do this problem to find out.

- On the map of Arkansas shown, find the actual distance between Clarksville and Little Rock. Use a ruler to measure.



ABOUT 80 MILES

PRACTICE PROBLEM # 2

On a map, the distance from Akron to Cleveland measures 2 centimeters. What is the actual distance if the scale of the map shows that 1 centimeter is equal to 30 kilometers?

EXAMPLE

Example

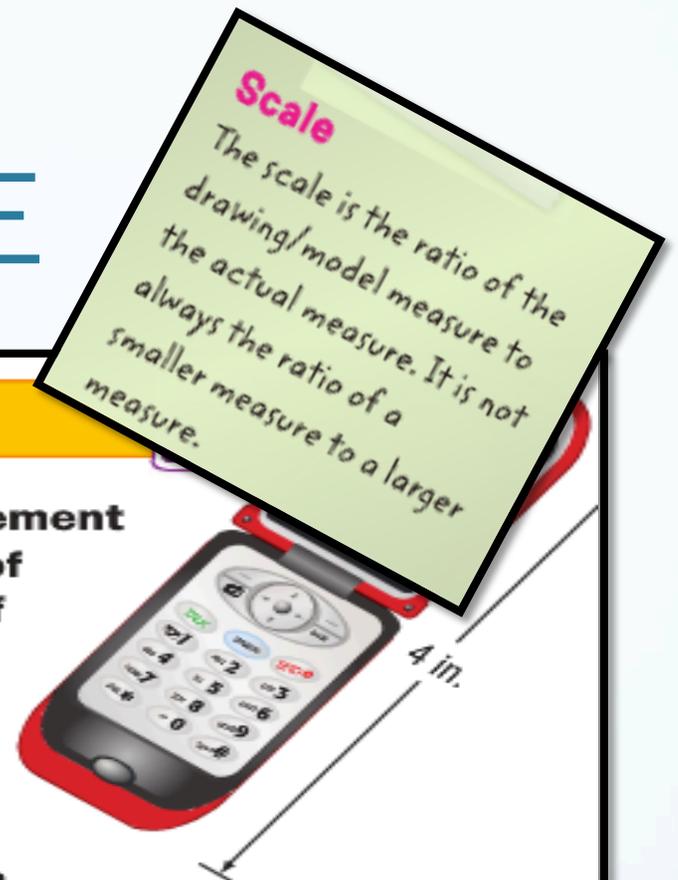
2. A graphic artist is creating an advertisement for this cell phone. If she uses a scale of 5 inches = 1 inch, what is the length of the cell phone on the advertisement?

Write a proportion using the scale.
Let a represent the length of the advertisement cell phone.

$$\begin{array}{ccc} \text{advertisement} & \rightarrow & \text{Scale} \\ \text{actual} & \rightarrow & \text{Length} \\ & & = \end{array} \quad \begin{array}{ccc} \leftarrow & \text{advertisement} \\ \leftarrow & \text{actual} \end{array}$$

Cross products

Simplify.



PRACTICE PROBLEM # 3

Got It? Do this problem to find out.

- b. A scooter is $3\frac{1}{2}$ feet long. Find the length of a scale model of the scooter if the scale is 1 inch = $\frac{3}{4}$ feet.

4 $\frac{2}{3}$ In.

PRACTICE PROBLEM # 4

An engineer makes a model of a bridge using a scale of 1 inch = 3 yards. The length of the actual bridge is 50 yards. What is the length of the model?

EXAMPLE

Find a Scale Factor

A scale written as a ratio without units in simplest form is called the **scale factor**.

Example



- 3. Find the scale factor of a model sailboat if the scale is 1 inch = 6 feet.**

$$\begin{aligned}\frac{1 \text{ inch}}{6 \text{ feet}} &= \frac{1 \cancel{\text{ inch}}}{72 \cancel{\text{ inches}}} \\ &= \frac{1}{72}\end{aligned}$$

Convert 6 feet to inches.

Divide out the common units.

The scale factor is $\frac{1}{72}$.

PRACTICE PROBLEM # 5

Got It? Do this problem to find out.

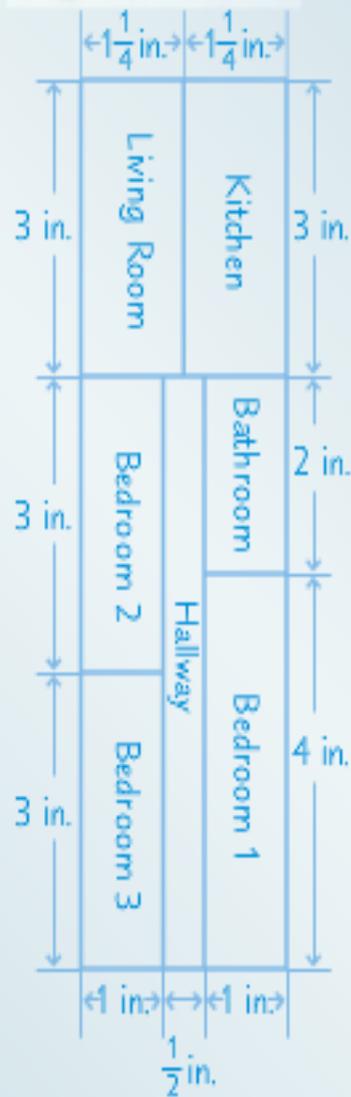
- c. What is the scale factor of a model car if the scale is
1 inch = 2 feet?

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PRACTICE PROBLEM # 6

Julie is constructing a scale model of her room. The rectangular room is $10\frac{1}{4}$ inches by 8 inches. If 1 inch represents 2 feet of the actual room, what is the scale factor and the actual area of the room?

EXAMPLE



Example



4. A floor plan for a home is shown at the left where $\frac{1}{2}$ inch represents 3 feet of the actual home. What is the actual area of bedroom 1?

Length of Bedroom 1.

$$\frac{\frac{1}{2} \text{ in.}}{3 \text{ ft}} = \frac{4 \text{ in.}}{w} \quad \leftarrow \text{floor plan}$$

\leftarrow actual

Width of Bedroom 1.

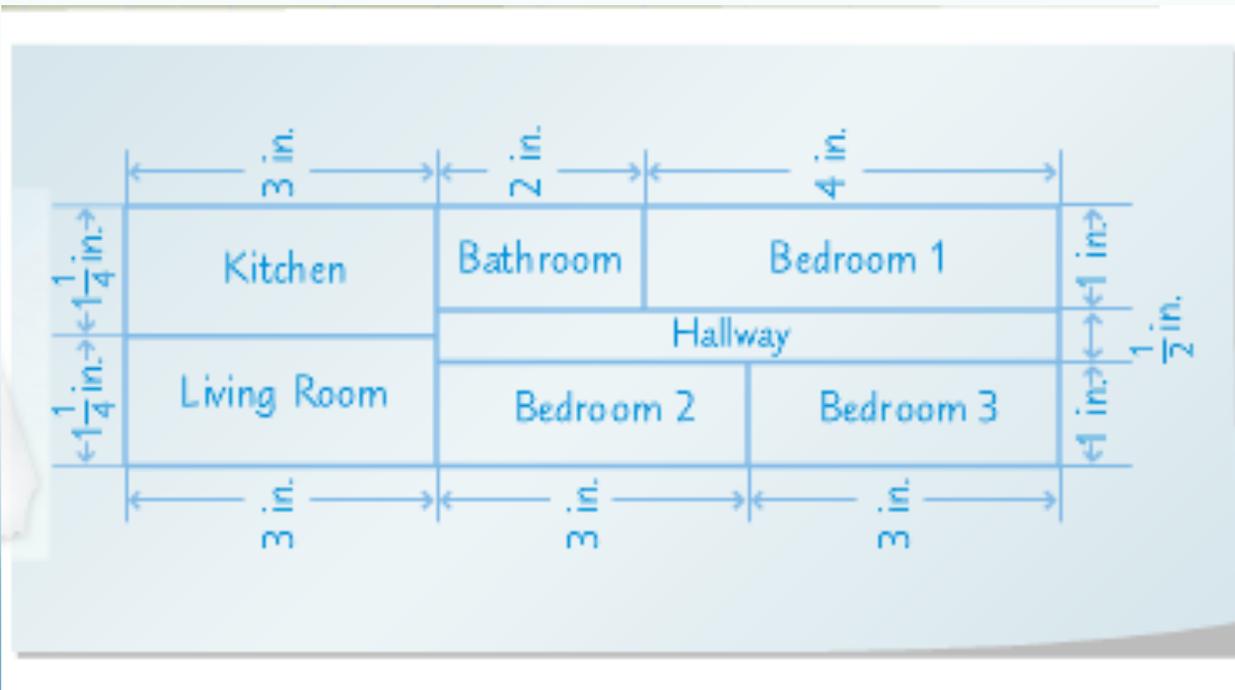
$$\frac{\frac{1}{2} \text{ in.}}{3 \text{ ft}} = \frac{1 \text{ in.}}{x} \quad \leftarrow \text{floor plan}$$

\leftarrow actual

PRACTICE PROBLEM # 7

Got It? Do this problem to find out.

d. What is the actual area of bedroom 3?



108ft²

That's all Folks!



kalilak